

**WHAT IS CLAIMED IS:**

1. A method for manufacturing an optical grating on a length of optical fiber having input and output ends, comprising the steps of:

(a) conducting guided light into said input end of said fiber and measuring light reflected back from said output end with an optical sensor;

(b) forming an optical grating in said fiber between said input and output ends;

(c) conducting guided light into said input end of said fiber and measuring light reflected back from said grating with an optical sensor; and

(d) comparing light measured in said steps (a) and (c) to determine a percentage of guided light reflected back from said grating.

2. The method of manufacturing an optical grating according to claim 1, wherein said step (b) comprises forming a fiber Bragg grating.

3. The method of manufacturing an optical grating according to claim 1, wherein said step (b) comprises forming a weak fiber Bragg grating.

4. The method of manufacturing an optical grating according to claim 2, wherein said step (b) comprises writing said grating into said fiber with an excimer laser.

5. The method of manufacturing an optical grating according to claim 2, wherein said step (b) comprises writing said grating into said fiber with a frequency doubled argon ion laser.

6. The method of manufacturing an optical grating according to claim 2, wherein said step (b) comprises writing said grating into said fiber with a near UV argon ion laser.

7. The method of manufacturing an optical grating according to claim 2, wherein said step (b) comprises writing said grating into said fiber with a laser.

8. The method of manufacturing an optical grating according to claim 1, further comprising the step of providing a flat cleave at said output end of said fiber prior to said step (a).

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9. The method of manufacturing an optical grating according to claim 1, further comprising the steps of applying an optical terminator between said grating and said input end, and forming a second grating between said optical terminator and said input end, and repeating steps (c) and (d) for said second grating.

10. The method of manufacturing an optical grating according to claim 3, wherein said steps (b), (c), and (d) are conducted simultaneously, and wherein said step (b) is terminated when said grating reflects a preselected percentage of said guided light.

11. The method of manufacturing an optical grating according to claim 1, wherein the measuring in said steps (a) and (c) comprises recording an output of an optical spectrum analyzer.

12. The method of manufacturing an optical grating according to claim 1, wherein the measuring in said steps (a) and (c) comprises recording an output of an optical power meter.

13. The method of manufacturing an optical grating according to claim 9, further comprising the steps of empirically determining a loss factor per unit length of said optical fiber, and correcting light measured in said step (a) with said loss factor to compensate for a change of the length of said fiber between said second grating and said input end.

14. The method of manufacturing an optical grating according to claim 1, further comprising the step of connecting said input end to a source of guided light and an optical sensor prior to said step (a).

15. The method of manufacturing an optical grating according to claim 14, wherein said connecting step is implemented by an optical coupler.

16. The method of manufacturing an optical grating according to claim 14, wherein said connecting step is implemented by an optical circulator.

17. A method of manufacturing a grating on a length of optical fiber having input and output ends, comprising the steps of:

(a) conducting guided light into said input end of said fiber and measuring light reflected back from said output end;

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- (b) defining an optical terminator on said fiber;
- (c) writing a grating in said fiber between said input end and said optical terminator;
- (d) conducting guided light into said input end of said fiber and measuring light reflected back from said grating, and
- (e) comparing the measured light from said step (a) with the measured light from said step (d) to determine a characteristic of said grating.

18. The method of manufacturing an optical grating according to claim 17, wherein said step (e) comprises determining the percentage of guided light reflected back from said grating.

19. The method of manufacturing an optical grating according to claim 17, further comprising the step of providing a flat cleave at said output end of said fiber prior to measuring in said step (a).

20. The method of manufacturing an optical grating according to claim 17, further comprising:

- (f) defining an optical terminator between said grating and said input end, and repeating steps (c), (d), and (e) for another grating.

21. The method according to claim 20, wherein the step of defining an optical terminator includes removing the grating from the length of optical fiber by breaking off a part of the fiber.

22. The method of manufacturing an optical grating according to claim 20, wherein said step (f) is repeated N times for N gratings, N being an integer.

23. The method of manufacturing an optical grating according to claim 21, further comprising:

- (g) winding a portion of the optical fiber onto a spool after each iteration of said step (f).

24. The method of manufacturing an optical grating according to claim 17, further comprising the steps of empirically determining a loss factor per unit length of said optical fiber, and correcting the measurement in said steps (a) and (d) with said

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loss factor to compensate for a shortening of the length of said fiber between said another grating and said input end.

25. The method of manufacturing an optical grating according to claim 14, wherein said fiber is on a delivery spool, and wherein a portion of said fiber is wound onto a take-up spool before said step (f).

26. The method of manufacturing an optical grating according to claim 17, wherein said steps (c), (d), and (e) are conducted simultaneously, and said step (c) is terminated when said grating reflects a preselected percentage of guided light.

27. The method of manufacturing an optical grating according to claim 17, wherein step (c) is terminated when said grating reflects between about 1% and 15% of the guided light conducted through said input end.

28. The method according to claim 26, wherein said grating reflects less than 10% of said guided light through said input end.

29. The method according to claim 27, wherein said grating reflects  $\leq 5\%$  of said light through said input end.

30. The method of manufacturing an optical grating according to claim 17, wherein step (c) is terminated when said grating reflects between about 2% and 4% of the guided light conducted through said input end.

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